Chapter 3: Describing Relationships

Key Vocabulary:	SSM/SSE
response variable	r^2
explanatory variable	coefficient of determination
independent variable	residuals
dependent variable	residual plot
scatterplot	influential observation
positive/negative association	
linear	**Calculator Skills:**
correlation	2-Var Stats
r-value	seq(X,X,min,max,scl)
regression line	sum
mathematical model	Diagnostic On
least-squares regression line	residual plot
”y-hat”	

3.1 Scatterplots and Correlation (pp.142-163)

1. What is the difference between a *response variable* and an *explanatory variable*?

2. How are response and explanatory variables related to *dependent* and *independent* variables?

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3. When is it appropriate to use a *scatterplot* to display data?

4. Which variable always appears on the horizontal axis of a scatterplot?

5. You can describe the overall pattern of a scatterplot by the…

6. Explain the difference between a *positive association* and a *negative association*.

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1.

2.

3.

4.

5.

7. What does *correlation* measure?

8. What is true about the relationship between two variables if the *r-value* is:
   a. Near 0?
   b. Near 1?
   c. Near -1?
   d. Exactly 1?
   e. Exactly -1?

9. Is *correlation* resistant to extreme observations? Explain.

10. What does it mean if two variables have *high correlation*?

11. What does it mean if two variables have *weak correlation*?

12. What does it mean if two variables have *no correlation*?

13. Explain why two variables must both be *quantitative* in order to find the *correlation* between them.

14. Does a correlation close to -1 or 1 always guarantee a linear relationship? Explain.

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1.a)

b)

c)

d)

2.

3.2 Least-Squares Regression (pp.164-197)

1. What is a regression line?

2. What is *extrapolation* and why is this dangerous?

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1.

2.

3,

4.

3. What is a *least-squares regression line*?

4. What is the formula for the equation of the *least-squares regression line*? Define each variable.

5. The *least-squares regression line* always passes through the point ...

6. What is a *residual*?

7. What special property do the residuals have? Why do they have this property?

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1.

2.

3.

8. What is a residual plot?

9. How can you calculate *residuals* on your calculator and use this to produce a *residual plot*?

10. If a *least-squares regression line* fits the data well, what characteristics should the *residual plot* exhibit?

11. What does the standard deviation of the residuals tell us?

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1.

2.

12. How is the *coefficient of determination* defined?

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1.

2.

13. If $r^2 = 0.95$, what can be concluded about the relationship between x and y?

14. What are three limitations of correlation and regression?

15. Under what conditions does an outlier become an *influential observation*?

16. What is a *lurking variable*?

17. Why does *association* not imply *causation*?